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Using Video Technology to Diagnose EFL Students' Cognitive Learning Difficulties in Public Speaking

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Abstract

This paper investigates EFL students' perceived learning difficulties in English public speaking by a novel approach to data analysis. Great speech footages were taken online and used as a means of introducing visual perceptions of 9 speaking skills defined as the student competence in English public speaking. 26 students studied these videos; AHP-weighted GRA method was then applied to analyze the data of students' perceptions of speech ability difficulties and sorted the data in order. Finally, GRA results were rearranged in an S-P chart format, which clearly represented the students' cognitive mapping of the speech difficulties in relation to their overall speech conceptualization.

Keywords: Public speaking; learning difficulties; video technology; improving classroom teaching; teaching/learning strategies; Grey Relational Analysis (GRA); Stuent-Problem chart (S-P chart)

1. Introduction

Along with written communication, ability to manage others and effective team leadership, public speaking has been reported by former students as essential to further career development (Zekeri, 2004). Scholars agree that we are entering into a era where text based literacy is no longer the only measure of intelligence, nor is it the only channel of valuable communications and knowledge acquisition for today's media-centered youths (Kenny, 2011; Petit, 2007; Stephens, 1998). The increasing familiarity of students with many forms of information technology devices in everyday life and their improved computer literacy

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should facilitate greater use of these technologies in cultivating students' speech skills more effectively. With the advent of the Internet, audiovisual materials tap the resources beyond classroom. Obvious advantages of the use of advanced technology include ease of accessing vast pools of data, images, sound and text. These cultural and technological changes have deep implications in learning practices and instructional practices in public speaking. Indeed, audiovisual stimulations in various forms have been successfully incorporated to speech training (Friend, Adams, & Curry, 2011; Procopio, 2011; Shih, 2010). Specifically this research takes advantage of stimulation from video technology in course design to diagnose students' difficulty patterns in order to improve communication skills in English public speaking.

1.1. The implementation of great speech visual aids in EFL public speaking classes

As early as World War II, filmstrips were studied as a training tool for soldiers (Hovland, Lumsdaine, & Sheffield, 1949). Since then educators have recognized the power of audiovisual materials in educational settings to capture the attention of learners, increase their motivation and enhance their learning experience. According to a summary of research and educator survey, educational television and videos has many benefits such as:

- Reinforce reading and lecture material
- Aid in the development of a common base of knowledge among students
- Enhance student comprehension and trigger important discussions
- Provide greater accommodation of diverse learning styles
- Increase student motivation and enthusiasm
- Lastly, promote teacher effectiveness (Saltrick, Honey, & Pasnick, 2004)

When used at the right time and in the right place, audiovisual materials exert positive contributions to language learning. Katchen (2002) reported that carefully chosen films could be a useful and extremely motivational teaching tool for both practicing listening skills and stimulating speaking and writing. Similarly, the essence of great speeches imparted in videos accelerates the learning process in public speaking. Thanks to technology, EFL language learners no longer need to physically sit in the hall or even go abroad for a speech in order to be exposed to many styles of presentations. Filmed speeches overcome the restriction of time and space. Speech footage provides an access to those speakers who otherwise are not accessible to ordinary people. Students can even listen and watch a moving delivery of great speakers who deceased long before us. Moreover, great speeches have been an important part of language culture and hence the assets of human oratory history. By viewing a visual representation of a great speech, students are encouraged to recognize the potential for social significance emitted from a speech performance. For ESL students, videos and films demonstrate communicative language within a language environment and cultural context (Wood, 1995).

Another important goal of video implementation is to have students witness a speech aimed at a more diverse audience and with more real-world relevance rather than public speaking in a classroom environment aimed often at a rather narrow audience (Ahlfeldt, 2009). The fact that the messages in the videotaped performances are designed for a much larger audience of web viewers serves the purpose. Students need to practice English public speaking in different contexts and for more serious events: business presentation, conference presentation, teaching, foreign contexts, etc., and students need role models in these regards. Videos recreate authentic inputs of different contexts and demonstrate successful cases to students.

In terms of the speech theory to be learned, video can create a solid link between them and their practical application (Canning-Wilson, 2000). Observing presentations of great speakers can help students understand the embodiment of essential theoretical constructs of public speaking as well as to feel the impacts of a successful speech. The rhythmic hand and arm movements, head nods, head gestures, facial

expression, dress, hand gestures, posture and details of the environment are all related to the structure of a speech message.

Especially, non-native speakers rely more heavily on visual clues to support their understanding and there is no doubt that video is an obvious medium for helping public speaking learners to interpret lectures of the speech theory effectively. Moreover, many non-native students tended more towards a static lecture style rather than toward dynamic and active participation on stage. Through video materials students are given an opportunity to discuss the speech delivery process, the merits of a speech performance, and analyze their own methods of performance. In this way, students become more aware of strategies that help them become better communicators.

Nevertheless, Canning-Wilson (2000) cautioned that if video was to be used in the classroom to improve listening comprehension, it should be shown in segments and not as a whole. In fact, constant visual stimuli may detract from the audiovisual component. Empirical evidence has shown that attention spans were lowered when watching videos that were used to teach foreign languages (Balatova, 1994). Denning (no date) also pointed out that one of the best ways of avoiding passive consumption of media was to exploit the ability of shown video in short, relevant segments, and to use segments from multiple programs. Hence, in this current study, we abided experts' advice by letting students control clips of good speeches supporting their observations in targeted skill trainings instead of showing the full online speech, while the instructor provided resources for course-related knowledge and skills.

1.2. Grey relational Analysis

The Grey relational analysis (GRA) based on the grey system theory by Deng (1989) can be used to solve complicated inter-relationships among multiple performance characteristics effectively. Among the many analytical tools developed for grey system theory, GRA is one of the most effective experimental processes in terms of dealing uncertain, multi-dimensional, discrete, and incomplete data. Its main functions are to calculate discrete data and quantify the factors, and tthrough the ordinal process the information is translated. For example, the grey system theory has been proven useful for dealing with poor, incomplete, and unsure information (Huang & Liao, 2003). One of the beauties of grey relational analysis (GRA) is that the research does not need much data. Now GRA has been applied in a wide range of fields such as product design (Liang, Lee, & Liu, 2009; Liang, Lee, & Weng, 2010; Liang, Sheu, Wang, Tzeng, & Nagai, 2011; Liang, Wang, & Wang, 2011), market survey (Lee, Chen, Liang, Wu, & Kao, 2010), social science (Sheu, Wang, Liang, Tzeng, & Nagai, 2010; Wang, Sheu, Liang, Tzeng, & Nagai, 2012), system modeling (Wang, Wang, Wen, Nagai, & Liang, 2011), and material science (Lee, Liang, Chen, & Wu, 2010).

In this current study, the grey relational analysis model based on AHP weight was applied to scientifically evaluate learning difficulties of 26 students who enrolled in a public speaking course after they reflected their own speech performance.

1.3. S-P chart analysis

The Student-Problem chart analysis (S-P chart analysis) was originally proposed by Sato (1980). It does not require making any assumptions on the test subject group and uses a nonparametric statistical approach. It was suitable for the application on formative tests in the classroom and it provided teachers with a systematic method to diagnose the aberrant phenomena of students' response and analyze the suitability of test items. Many American and Japanese scholars joined the study of S-P chart analysis (Harnish & Linn, 1981; Tatsuoka & Tatsuoka, 1983) and it was promoted to be one of the modern test theories and an important assessment tool in primary and secondary schools (Sato, 1984). Since then, the

S-P chart analysis theory has been used for diagnosing student learning conditions, instructive achievement, problem quality, and the abnormal performances held by students or problems. In addition, teachers are able to use the analyzed S-P chart data to draw up a performance profile curve. For example, by studying the performance profile curve, teachers can give proper remedial instruction and better guidance for learners who need it after the examination.

A typical S-P chart data sample with an S-curve and P-curve is shown in Figure 1. The vertical axis indicates the ID number of respondents. The sign + indicates the question item correctly answered. In the bottom row, the number indicates the number of students who answer this problem correctly. The right column indicates each student's score ranked from high to low. The S-curve shows how students agree with the problems, and the P-curve shows how the problems agree with the students. In an ideal situation these two curves should coincide, but in a practical situation these two curves will diversify (Sato, 1980).

+Correct		Problem ID (easy-->difficult)										
		4	5	2	3	1	6	7	10	8	9	Score (high-->low)
	3	+	+	+	+	+	+	+	+	+	+	10
	5	+	+	+	+	+	+	+	+	D	+	9
	8	+	+	+	+	+	D	+	+	+	+	9
	4	+	+	+	+	+	B	+	+	+	C	8
	9	+	+	+	+	+	+	+	A	C	B	7
Student ID	2	+	+	+	+	C	A	+	+	A	C	6
	6	+	+	+	+	D	+	+	C	A	B	6
	10	+	B	+	B	+	+	C	+	A	B	5
	1	+	+	D	D	A	B	C	+	A	A	3
	7	+	+	D	D	A	+	B	D	C	A	3
	12	A	+	D	D	+	+	B	D	C	A	3
	11	+	B	B	+	A	A	B	D	C	A	2
Standard answer		C	D	A	A	B	C	D	B	B	D	
Correct		11	10	8	8	7	7	7	7	3	3	

Fig. 1. Example of an S-P chart (black line: S-curve, green line: P-curve)

SP Chart has produced a unique and powerful diagnosis tool that differs from the traditional process. However, The S-P score table proposed by Sato pays little attention to diagnose each student's individual ability of those who score the same. For example Student (5) and Student (8) score the same, i.e. 9, but S(5) was ranked in front of S(8). Therefore, prioritizing student performance and refining the difficulty level of evaluation items are still interesting to researchers to do further study. For example, by incorporating parameters like individual ability generated by GRA, we got an enhanced S-P model (Sheu, Wang, Liang, Tzeng, & Nagai, 2010; Wang, Sheu, Liang, Tzeng, & Nagai, 2012) to diagnose student performance information solving abilities associated with test items.

2. Methodology

2.1. Research design

To better find out their learning problems, the study designed a video-based project and identified a set of 9 evaluation items to decipher the students' cognitive learning difficulties. The 9 elements were adopted from the best-selling textbook in Taiwan according to a survey conducted among the largest EFL textbook dealers in Taiwan (Table 1). The best sold book title was *Speaking of Speech* (New/e) and the nine abilities were listed as P(A)-P(I) in Table 2.

Table 1. Bestsellers from top 5 EFL book dealers

Book dealer	No. 1 textbook title	Sales volume (2011)	Survey date
B(1)	Speech Communication Made Simple (3/e)	1327	2/27/2012
B(2)	Speaking of Speech	2000	1/4/2012
B(3)	Challenge of Effective Speaking (15/e)	437	1/5/2012
B(4)	Effective Presentation Skills	1000	2/27/2012
B(5)	Dynamic Presentations	0	1/7/2012

Table 2. The targeted abilities in *Speaking of Speech* (New/e)

Factor in the public speaking training	Training content of the factor
P(A) Posture	Maintain a good posture Stand tall Position the whole body
P(B) Eye contact	Look the audience in the eye
P(C) Gestures	Use gestures to emphasize important points & support the verbal message
P(D) Voice inflection	Tone and character of voice Use stress to emphasize key words Breathe correctly Adjust volume Adjust pace/rate Practice articulation Pauses effectively Stretch key words Vary intonation/pitch Avoid filler words
P(E) Preparing effective visual aids	Understand different types of visuals Learn different methods for displaying visuals Coordinate body language with visuals Use proper equipments Select explaining phrases for visuals' maximum output
P(F) Explaining visual aids	Explain visuals for their maximum output
P(G) Opening the speech	Use Openers techniques Engage the audience from the start Provide a preview Establish a compassion with the topic
P(H) Organizing & outlining the speech body	Choose a topic Analyze the audience Construct a thesis statement Learn the structure of an outline Organize main points Organize subpoints Provide evidence of the message Use transitions/signposts Connect the visuals into the message
P(I) Closing the speech	Provide a summary for the audience to remember Share personal experiences Call for action End as you started

A public speaking class of 26 student participants S(1)-S(26) enrolled this research. None of them had received intensive English presentation training before this study. They were senior EFL majors in a technological university who had studied public speaking for a semester, and were to be under the process of training for another semester. Throughout the semester, students received instructions of how to deliver English speech as well as practiced two types of speech (informative and persuasive). They already had some experience and learned some theory about speech making. The lectures familiarized them with the above 9 criteria such as voice, body languages, use of visual aids, and speech structure. Via computer

searchers, students in small teams used Internet resources to find, evaluate and commented on segments of a recorded great speaker's speech. Students must prepare for using video segments by establishing clear 9 speech criteria for viewing and decided what segments would best support these criteria. Then they also use these 9 factors to reflect on their own public speech difficulties.

2.2. Data analysis

Next, Respondents were asked give a paired evaluation of the difficulty level between each two factors in an AHP matrix by 9 scales: 9, 7, 5, 3, 1, 1/3, 1/5, 1/7, 1/9. AHP procedure is then applied to determine the evaluated index weight in each student's data. The same procedure was repeated until the final respondent's, S(26) was reached. The total students' CI value could be consolidated. All the CI value < 0.1, which meant that the whole data set were consistent and clean (Table 3).

Table 3. Student S(1)-S(26) evaluation on difficulty in a GRA Matrix with CI values from AHP procedure

***S*(1)**	P(A)	P(B)	P(C)	P(D)	P(E)	P(F)	P(G)	P(H)	P(I)	LGRA
Larger	**7**	**7**	**5**	**9**	**1**	**1**	**3**	**5**	**7**	(value)
P(A)	1	3	1/3	3	1/5	1/7	1/5	1/3	3	0.1995
P(B)	1/3	1	1/3	3	1/7	1/7	1/5	1/5	3	0.1267
P(C)	3	3	1	5	1/5	1/5	1/3	1/3	3	0.329
P(D)	1/3	1/3	1/5	1	1/7	1/9	1/7	1/5	1	0
P(E)	5	7	5	7	1	1	3	3	7	0.7785
P(F)	7	7	5	9	1	1	3	5	7	1
P(G)	5	5	3	7	1/3	1/3	1	3	5	0.6564
P(H)	3	5	3	5	1/3	1/5	1/3	1	5	0.472
P(I)	1/3	1/3	1/3	1	1/7	1/7	1/5	1/5	1	0.0034
$C.I = 0.091986924 < 0.1$										

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S(26)	P(A)	P(B)	P(C)	P(D)	P(E)	P(F)	P(G)	P(H)	P(I)	LGRA
Larger	**1**	**1**	**1**	**1**	**5**	**5**	**7**	**7**	**7**	(value)
P(A)	1	1	1	1	5	5	7	7	7	1
P(B)	1	1	1	1	1	1	3	3	3	0.279
P(C)	1	1	1	1	1	1	3	3	3	0.279
P(D)	1	1	1	1	5	5	7	7	7	1
P(E)	1/5	1	1	1/5	1	1	3	3	1	0.1888
P(F)	1/5	1	1	1/5	1	1	3	3	3	0.2733
P(G)	1/7	1/3	1/3	1/7	1/3	1/3	1	1	1	0
P(H)	1/7	1/3	1/3	1/7	1/3	1/3	1	1	1	0
P(I)	1/7	1/3	1/3	1/7	1	1/3	1	1	1	0.0189
$C.I = 0.065605023 < 0.1$										

	P(A)	P(B)	P(C)	P(D)	P(E)	P(F)	P(G)	P(H)	P(I)	CI
Larger	**1**	**1**	**1**	**1**	**0.7785**	**1**	**1**	**1**	**1**	(value)
S(1)	0.1995	0.1267	0.329	0	0.7785	1	0.6564	0.472	0.0034	**0.091986924 < 0.1**
S(2)	0.3638	0.718	0.4361	1	0.0454	0.1192	0.0193	0.0249	0	**0.066108436 < 0.1**
S(3)	0.651	0.0179	0.6478	1	0.4282	0.2455	0	0.1714	0.0001	**0.035124465 < 0.1**
S(4)	0.0989	0.0989	0.4139	1	0.0839	0	0.0992	0.678	0.2942	**0.088531712 < 0.1**
S(5)	0.1352	1	0.5369	0.1334	0	0.5931	0.0561	0.3518	0.3333	**0.097019738 < 0.1**
S(6)	0.0001	0.6745	1	0.1504	0.3813	0.3813	0	0.8789	0.1504	**0.057905979 < 0.1**
S(7)	1	0	0.0127	0.7143	0.1899	0.0898	0.0106	0.0127	0.0096	**0.056432499 < 0.1**
S(8)	1	1	0.3243	0.1662	0	0.0039	0.5468	0.1021	0.0196	**0.099296238 < 0.1**
S(9)	0.1118	0	0.0403	1	0.3508	0.7663	0.6695	0.3743	0.1154	**0.055363028 < 0.1**
S(10)	0.2776	0	0.6092	0	0.2776	1	0	0.6092	0.1767	**0.054058201 < 0.1**
S(11)	0	0	1	1	0.4989	0.4989	0.1979	0.1979	0.1979	**0.02097988 < 0.1**
S(12)	0.0189	0.2275	0.2275	0.4149	0.1353	1	0	0.7724	0.5676	**0.04181418 < 0.1**
S(13)	0.4629	0.3193	1	0.6817	0.1562	0.1557	0	0.0008	0.0055	**0.099442388 < 0.1**
S(14)	0.7795	0	1	0.1101	0.5874	0.3996	0.2097	0.7201	0.1628	**0.0936768 < 0.1**
S(15)	0.7993	0.22	0.158	1	0.0051	0.2189	0	0.7993	0	**0.080289569 < 0.1**
S(16)	0.81	1	0.0237	0.0237	0.0237	0.3527	0.0718	0.4938	0	**0.067480195 < 0.1**
S(17)	1	0	0.0104	0.2791	0.259	0.2915	0.0293	0.4348	0.6128	**0.09537862 < 0.1**
S(18)	0.0803	1	0.2218	1	0.4042	0.7039	0	0.2862	0.0264	**0.085474349 < 0.1**
S(19)	0.1267	0.1995	0.3666	1	0	0.0008	0.6564	0.472	0.7785	**0.094828768 < 0.1**
S(20)	0.4721	0	0.2642	1	0.5799	0.6306	0.0634	1	0.1416	**0.095283686 < 0.1**
S(21)	0.2818	0	0	0	0.2818	0.6261	0	1	0	**0.020077101 < 0.1**
S(22)	0.0418	0.6195	0.534	1	0	0.2834	0.0981	0.1904	0.1133	**0.058241455 < 0.1**
S(23)	0	0	0	0	0.0499	0.0499	1	0.3654	1	**0.030335811 < 0.1**
S(24)	0.0615	0.0117	0.5172	0.4349	0.2514	0.1229	0	1	0.7283	**0.098726242 < 0.1**
S(25)	0.361	0.3082	0	1	0.169	0.1862	0.4957	0.7753	0.5697	**0.084348408 < 0.1**
S(26)	1	0.279	0.279	1	0.1888	0.2733	0	0	0.0189	**0.065605023 < 0.1**

After making sure the validity of the data, the AHP-revised GRA evaluation model was finalized to scientifically evaluate the data of students' learning difficulties. The GRA procedure generated the results shown in Table 4. The LGRA-Student values were further sorted out and showed the ranking of students

(Table 5) from the one (S(7))who has the most different mindset regarding speech skill difficulty from the rest of his/her cohorts, to the student (S(25)) whose mindset of speech difficulty was the most representative of the respondents.

Table 4. GRA-S value

	P(A)	P(B)	P(C)	P(D)	P(E)	P(F)	P(G)	P(H)	P(I)
Larger	**1**	**1**	**1**	**1**	**0.7785**	**1**	**1**	**1**	**1**
S(1)	0.1995	0.1267	0.329	0	0.7785	1	0.6564	0.472	0.0034
S(2)	0.3638	0.718	0.4361	1	0.0454	0.1192	0.0193	0.0249	0
S(3)	0.651	0.0179	0.6478	1	0.4282	0.2455	0	0.1714	0.0001
S(4)	0.0989	0.0989	0.4139	1	0.0839	0	0.0992	0.678	0.2942
S(5)	0.1352	1	0.5369	0.1334	0	0.5931	0.0561	0.3518	0.3333
S(6)	0.0001	0.6745	1	0.1504	0.3813	0.3813	0	0.8789	0.1504
S(7)	1	0	0.0127	0.7143	0.1899	0.0898	0.0106	0.0127	0.0096
S(8)	1	1	0.3243	0.1662	0	0.0039	0.5468	0.1021	0.0196
S(9)	0.1118	0	0.0403	1	0.3508	0.7663	0.6695	0.3743	0.1154
S(10)	0.2776	0	0.6092	0	0.2776	1	0	0.6092	0.1767
S(11)	0	0	1	1	0.4989	0.4989	0.1979	0.1979	0.1979
S(12)	0.0189	0.2275	0.2275	0.4149	0.1353	1	0	0.7724	0.5676
S(13)	0.4629	0.3193	1	0.6817	0.1562	0.1557	0	0.0008	0.0055
S(14)	0.7795	0	1	0.1101	0.5874	0.3996	0.2097	0.7201	0.1628
S(15)	0.7993	0.22	0.158	1	0.0051	0.2189	0	0.7993	0
S(16)	0.81	1	0.0237	0.0237	0.0237	0.3527	0.0718	0.4938	0
S(17)	1	0	0.0104	0.2791	0.259	0.2915	0.0293	0.4348	0.6128
S(18)	0.0803	1	0.2218	1	0.4042	0.7039	0	0.2862	0.0264
S(19)	0.1267	0.1995	0.3666	1	0	0.0008	0.6564	0.472	0.7785
S(20)	0.4721	0	0.2642	1	0.5799	0.6306	0.0634	1	0.1416
S(21)	0.2818	0	0	0	0.2818	0.6261	0	1	0
S(22)	0.0418	0.6195	0.534	1	0	0.2834	0.0981	0.1904	0.1133
S(23)	0	0	0	0	0.0499	0.0499	1	0.3654	1
S(24)	0.0615	0.0117	0.5172	0.4349	0.2514	0.1229	0	1	0.7283
S(25)	0.361	0.3082	0	1	0.169	0.1862	0.4957	0.7753	0.5697
S(26)	1	0.279	0.279	1	0.1888	0.2733	0	0	0.0189

Table 5. GRA-S value and ranking

	LGRA (value)
S(1)	0.6649
S(2)	0.3784
S(3)	0.5359
S(4)	0.4366
S(5)	0.6661
S(6)	0.7184
S(7)	0
S(8)	0.487
S(9)	0.6699
S(10)	0.475
S(11)	0.6589
S(12)	0.7005
S(13)	0.4092
S(14)	0.9034
S(15)	0.5295
S(16)	0.3711
S(17)	0.5016
S(18)	0.706
S(19)	0.8167
S(20)	0.9164
S(21)	0.0843
S(22)	0.5117
S(23)	0.1057
S(24)	0.5571
S(25)	1
S(26)	0.4313

⇒

	LGRA (value)	**Student ranking**
S(7)	0	26
S(21)	0.0843	25
S(23)	0.1057	24
S(16)	0.3711	23
S(2)	0.3784	22
S(13)	0.4092	21
S(26)	0.4313	20
S(4)	0.4366	19
S(10)	0.475	18
S(8)	0.487	17
S(17)	0.5016	16
S(22)	0.5117	15
S(15)	0.5295	14
S(3)	0.5359	13
S(24)	0.5571	12
S(11)	0.6589	11
S(1)	0.6649	10
S(5)	0.6661	9
S(9)	0.6699	8
S(12)	0.7005	7
S(18)	0.706	6
S(6)	0.7184	5
S(19)	0.8167	4
S(14)	0.9034	3
S(20)	0.9164	2
S(25)	1	1

The same procedures were performed on the Ps, yielding the results in Table 6. The LGRA-Problem values were further sorted out and showed the ranking of difficulty (Table 7) from the easiest (P(G)) to the most difficult (P(D)).

Table 6. GRA-P value

	S(1)	S(2)	S(3)	S(4)	S(5)	S(6)	S(7)	S(8)	S(9)	S(10)	S(11)	S(12)	S(13)	S(14)	S(15)	S(16)	S(17)
Larger	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**
P(A)	0.1995	0.3638	0.651	0.0989	0.1352	0.0001	1	1	0.1118	0.2776	0	0.0189	0.4629	0.7795	0.7993	0.81	1
P(B)	0.1267	0.718	0.0179	0.0989	1	0.6745	0	1	0	0	0	0.2275	0.3193	0	0.22	1	0
P(C)	0.329	0.4361	0.6478	0.4139	0.5369	1	0.0127	0.3243	0.0403	0.6092	1	0.2275	1	1	0.158	0.0237	0.0104
P(D)	0	1	1	1	0.1334	0.1504	0.7143	0.1662	1	0	1	0.4149	0.6817	0.1101	1	0.0237	0.2791
P(E)	0.7785	0.0454	0.4282	0.0839	0	0.3813	0.1899	0	0.3508	0.2776	0.4989	0.1353	0.1562	0.5874	0.0051	0.0237	0.259
P(F)	1	0.1192	0.2455	0	0.5931	0.3813	0.0898	0.0039	0.7663	1	0.4989	1	0.1557	0.3996	0.2189	0.3527	0.2915
P(G)	0.6564	0.0193	0	0.0992	0.0561	0	0.0106	0.5468	0.6695	0	0.1979	0	0	0.2097	0	0.0718	0.0293
P(H)	0.472	0.0249	0.1714	0.678	0.3518	0.8789	0.0127	0.1021	0.3743	0.6092	0.1979	0.7724	0.0008	0.7201	0.7993	0.4938	0.4348
P(I)	0.0034	0	0.0001	0.2942	0.3333	0.1504	0.0096	0.0196	0.1154	0.1767	0.1979	0.5676	0.0055	0.1628	0	0	0.6128

(Table 6 continued)

	S(18)	S(19)	S(20)	S(21)	S(22)	S(23)	S(24)	S(25)	S(26)
Larger	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**
P(A)	0.1995	0.1267	0.329	0	0.7785	1	0.6564	0.472	0.0034
P(B)	0.3638	0.718	0.4361	1	0.0454	0.1192	0.0193	0.0249	0
P(C)	0.651	0.0179	0.6478	1	0.4282	0.2455	0	0.1714	0.0001
P(D)	0.0989	0.0989	0.4139	1	0.0839	0	0.0992	0.678	0.2942
P(E)	0.651	0.0179	0.6478	1	0.4282	0.2455	0	0.1714	0.0001
P(F)	0.0001	0.6745	1	0.1504	0.3813	0.3813	0	0.8789	0.1504
P(G)	1	0	0.0127	0.7143	0.1899	0.0898	0.0106	0.0127	0.0096
P(H)	1	1	0.3243	0.1662	0	0.0039	0.5468	0.1021	0.0196

Table 7. GRA-P value and ranking

	LGRA (value)
P(A)	0.5789
P(B)	0.2721
P(C)	0.6115
P(D)	1
P(E)	0.2547
P(F)	0.6484
P(G)	0
P(H)	0.9053

⇒

	LGRA (value)	**Problem ranking**
P(G)	0	9
P(I)	0.1519	8
P(E)	0.2547	7
P(B)	0.2721	6
P(A)	0.5789	5
P(C)	0.6115	4
P(F)	0.6484	3
P(H)	0.9053	2

P(I)	0.1118	0	0.0403	1	0.3508	0.7663	0.6695	0.3743	0.1154	***P(I)***	0.1519	***P(D)***	1	1

Combining Table 5 and Table 7, we got a chart that functions like an S-P Chart, only more precise (Table 8). To conform to the scheme of a typical S-P chart, LGRA-S value ranking serves as the vertical axis and LGRA-P value ranking serves as the horizontal axis. According to the S-P chart, the most difficult ability to acquire is located on the far right of the vertical axis, while the easiest speaking technique for students is located on the far left. In the respondents' cognition, it was *P(D) voice variation →P (H) Organizing & outlining the speech body→ P(F) Explaining visual aids → P(C) Gestures → P(A) Posture→ P(B) Eye contact → P(E) Preparing effective visual aids → P (I) Closing the speech → P(G) Opening the speech.*

As to students' mindset, S (25) located on the bottom of the chart represented the consensus of what most respondents felt toward the difficulty levels of the nine skills, while S(7) located on the top shared the least consensus with other fellow students, meaning that S(7) thought very differently from others.

Table 8. GRA values in the scheme of S-P chart

	P(G)	***P(I)***	***P(E)***	***P(B)***	***P(A)***	***P(C)***	***P(F)***	***P(H)***	***P(D)***	
	0	**0.1519**	**0.2547**	**0.2721**	**0.5789**	**0.6115**	**0.6484**	**0.9053**	**1**	**LGRA (value)**
S(7)	0.0106	0.0096	0.1899	0	1	0.0127	0.0898	0.0127	0.7143	**0**
S(21)	0	0	0.2818	0	0.2818	0	0.6261	1	0	**0.0843**
S(23)	1	1	0.0499	0	0	0	0.0499	0.3654	0	**0.1057**
S(16)	0.0718	0	0.0237	1	0.81	0.0237	0.3527	0.4938	0.0237	**0.3711**
S(2)	0.0193	0	0.0454	0.718	0.3638	0.4361	0.1192	0.0249	1	**0.3784**
S(13)	0	0.0055	0.1562	0.3193	0.4629	1	0.1557	0.0008	0.6817	**0.4092**
S(26)	0	0.0189	0.1888	0.279	1	0.279	0.2733	0	1	**0.4313**
S(4)	0.0992	0.2942	0.0839	0.0989	0.0989	0.4139	0	0.678	1	**0.4366**
S(10)	0	0.1767	0.2776	0	0.2776	0.6092	1	0.6092	0	**0.475**
S(8)	0.5468	0.0196	0	1	1	0.3243	0.0039	0.1021	0.1662	**0.487**
S(17)	0.0293	0.6128	0.259	0	1	0.0104	0.2915	0.4348	0.2791	**0.5016**
S(22)	0.0981	0.1133	0	0.6195	0.0418	0.534	0.2834	0.1904	1	**0.5117**
S(15)	0	0	0.0051	0.22	0.7993	0.158	0.2189	0.7993	1	**0.5295**
S(3)	0	0.0001	0.4282	0.0179	0.651	0.6478	0.2455	0.1714	1	**0.5359**
S(24)	0	0.7283	0.2514	0.0117	0.0615	0.5172	0.1229	1	0.4349	**0.5571**
S(11)	0.1979	0.1979	0.4989	0	0	1	0.4989	0.1979	1	**0.6589**
S(1)	0.6564	0.0034	0.7785	0.1267	0.1995	0.329	1	0.472	0	**0.6649**
S(5)	0.0561	0.3333	0	1	0.1352	0.5369	0.5931	0.3518	0.1334	**0.6661**
S(9)	0.6695	0.1154	0.3508	0	0.1118	0.0403	0.7663	0.3743	1	**0.6699**
S(12)	0	0.5676	0.1353	0.2275	0.0189	0.2275	1	0.7724	0.4149	**0.7005**
S(18)	0	0.0264	0.4042	1	0.0803	0.2218	0.7039	0.2862	1	**0.706**
S(6)	0	0.1504	0.3813	0.6745	0.0001	1	0.3813	0.8789	0.1504	**0.7184**
S(19)	0.6564	0.7785	0	0.1995	0.1267	0.3666	0.0008	0.472	1	**0.8167**
S(14)	0.2097	0.1628	0.5874	0	0.7795	1	0.3996	0.7201	0.1101	**0.9034**
S(20)	0.0634	0.1416	0.5799	0	0.4721	0.2642	0.6306	1	1	**0.9164**
S(25)	0.4957	0.5697	0.169	0.3082	0.361	0	0.1862	0.7753	1	**1**

3. Conclusion

The paper details an innovative methodology to investigate the difficulties which EFL students encounter in English public speaking by combining visual materials and a novel approach to data. Speech footages in English are taken from the Internet and used as a means of introducing visual perceptions of speaking skills, in which 9 speech abilities are further identified to define the student competence in English public speaking. 26 students study and reflect on these inspiring videos. Afterward, the data of perceptions of speech ability difficulties are obtained from the students. The AHP and GRA methods are then applied to analyze students' perceived difficulties and sort the data in order. Finally, GRA results are set up in the scheme of an S-P Chart. By analyzing the students' response patterns, a traditional S-P chart method is a good way to obtain diagnostic information and used as guidance to give students additional training in certain speech skills. However, the research in this paper validates an improved evaluation

model of a Grey-based S-P chart as precise, simple and feasible in synthetic evaluating student learning difficulties in English speech delivery. It clearly represented the students' cognitive mapping of the speech difficulties in relation to their overall speech conceptualization, i.e. the most difficult *P(D) voice variation →P (H) Organizing & outlining the speech body→ P(F) Explaining visual aids → P(C) Gestures → P(A) Posture→ P(B) Eye contact → P(E) Preparing effective visual aids → P (I) Closing the speech →* the easiest *P(G) Opening the speech*. The result of the study offers a valuable reference for improving course design in EFL public speaking class. It can improve classroom teaching because instructors hereby develop better teaching strategies with more focused course design. It also help the students adjust learning strategies to acquire the public speaking skills more effectively.

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